

REMARKS

Claims 1-26 are pending.

Claims 1,7-9, and 18 are rejected.

Claims 2-6, 10-17, and 19-26 are allowed

Claims 1, 7-9 and 18 are amended herein.

**I. RESPONSE TO APRIL 1, 2005 OFFICE ACTION**

On March 21, 2005, Applicants responded the Office Action having a mailing date of December 19, 2004 (the "Office Action") by submitting an Amendment Under 37 C.F.R. § 1.111 (the "March 21, 2005 1.111 Amendment"). The Patent Office thereafter issued a Notice of Non-Compliant Amendment (the "PTO Notice") on April 1, 2005 based upon the grounds that Applicant did not list claim 26 of the Application when amending the claims. As stated above, Applicant has now done so in this Revised 1.111 Amendment. To avoid any confusion, Applicants are submitting this response and including the amendments and remarks made in its March 21, 2005 1.111 Amendment. Accordingly, this Revised 1.111 Amendment shall address all issues raised in the Office Action and the PTO Notice.

**II. AMENDMENT TO THE CLAIMS**

Applicant has amended Claims 1, 7-9 and 18 to make certain grammatical changes to clarify the claims and to use appropriate language for antecedent basis purposes. For example, when referring to "a member of precursor material," the Applicants use the entire phrase rather than the shortened "said member." Applicant respectfully asserts that the amendments to Claims 1, 7-9 and 18 are not narrowing amendments made for a reason related to the statutory requirements for a patent that will give rise to prosecution history estoppel. *See Festo Corp. v. Shoketsu Kinzoku Kogyo*

**AMENDMENT TO THE DRAWINGS**

Please replace Sheet 1/6 in the Application with the enclosed replacement Sheet 1/6.

*Kabushiki Co.*, 535 U.S. 722, 122 S. Ct. 1831, 1839-40, 62 U.S.P.Q.2d 1705, 1711-12 (2002).

### III. AMENDMENTS TO THE DRAWINGS

The attached Sheet 1/6 replaces original Sheet 1/6. Upon review of Fig. 1 appearing on Sheet 1/6, Applicants identified that Fig. 1 inadvertently omitted reference number 22 for the solenoid magnet. Applicants have thus added proper reference to the number 22 in Fig. 1 for the solenoid magnet on the attached Sheet 1/6. As the original specification contains reference to solenoid magnet 22 (*see, e.g.*, Application, at 4, *ll.* 27-30), no new matter is being added by the replacement of the attached Sheet 1/6.

### IV. REJECTION UNDER 35 U.S.C. § 102

The Examiner rejected Claims 1, 7-9, and 18 under 35 U.S.C. § 102(a and e), as being anticipated by US Patent 2003/014313 to *Boulos et al.* hereafter (“*Boulos*”). The Examiner states that “*Boulos et al.* shows a nanopowder synthesis system and method thereof for substantially increasing production rates of nanopowder (or increase yields) in which at least one member of precursor material is immersed in a gaseous atmosphere 16 of one of a reaction gas, a quenching gas, and a combination thereof (i.e., titanium tetrachloride, page 3, paragraph [0059]), a high magnetic field [*sic*, field] (i.e., solenoid coil or magnet 18) is applied to the precursor material in an area of plasma interaction with the at least one member for generating high magnetic field and plasma, wherein the plasma that interacts with the member and the gaseous atmosphere is formed to produce the nanopowder.” Office Action, at 2.

Applicant respectfully traverses these rejections.

Claim 1. Claim 1 is a method for increasing the production rates of nanopowders, which includes, among other things, the step of “applying a high magnetic field to said precursor material in an area of plasma interaction with said at least one member of

precursor material.” The Examiner suggests that *Boulos* shows the claimed application of a high magnetic field by pointing to the use of induction coil 18. As expressly defined in the Application, *high magnetic field* means “a magnetic field in the range of 0.50 or more Tesla.” Application, at 4, line 20. Thus, the Examiner’s suggestion is in error in that the induction coil 18 does not create a *high magnetic field*. A person of ordinary skill in the art of the Application would immediately recognize any magnetic field created by induction coil 18 would be, at best negligible, and certainly magnitudes less than 0.5 Tesla. Rather than applying a high magnetic field, the high frequency electric current in induction coil 18 is used to create a plasma of the gas or gasses in mixing chamber 16. The plasma is produced by *induction heating* the gas in mixing chamber 16 to ionize the gas and produce and sustain the plasma. *See Boulos*, paragraph [0061]. Accordingly, there is no disclosure or teaching in *Boulos* of any application of a high magnetic field.

Given the purpose of induction coil 18, there is no disclosure and not even the suggestion to modify the process of *Boulos* to apply a high magnetic field. To the contrary, a person of ordinary skill in the art would further recognize that if attempts were made to modify the process described in *Boulos* to increase the current to a level that would theoretically produce a magnetic field of at least 0.50 Tesla, the use of such a high current would disintegrate the induction coil 18.

Therefore the Applicants respectfully assert that the rejection of Claim 1 as being anticipated by *Boulos* is traversed by the above arguments.

Claim 7. The Examiner has rejected Claim 7 for the same reasons as the Examiner has rejected Claim 1. Claim 7 is directed to a system implementing method steps of Claim 1. Claim 7 includes, among other things, (i) a means for applying a high magnetic field to the at least one member of precursor material in near proximity of the area of interaction of the at least one member of precursor material with a plasma, and (ii) a power means, in electrical connection with the at least one member of precursor material and the means for applying a high magnetic field, for creating the plasma in the presence of the high magnetic field to produce the nanopowder. The Applicants have

shown, in its above discussions for Claim 1, that *Boulos* does not teach or suggest a means for applying a high magnetic field to a precursor member in near proximity of the area of interaction of the member of precursor material with a plasma.

Furthermore, *Boulos* does not teach or suggest power means, in electrical connection with the member of precursor material and the means for applying the magnetic field, wherein the power means creates the plasma in the presence of the high magnetic field to produce the nanopowder. The only power means of *Boulos* is the “implied power means” required for induction coil 18 and *has no connection* to the precursor material.

Moreover, the Examiner has failed to differentiate between Claim 1 and Claim 7 in his arguments for rejection of Claim 7. Therefore, the Examiner has failed to make a *prima facie* case of anticipation for failing to specifically address those elements of Claim 7 not recited in Claim 1. The Applicants, therefore, respectfully assert that the rejection of Claim 7 as being anticipated by *Boulos* is traversed by the above arguments and for the same reasons as Claim 1.

Claim 8. Claim 8 is an independent method claim, which, among other things, includes at least two steps not recited in Claim 1; nonetheless, the Examiner rejected Claim 8 for the same reasons as Claim 1 and 7. The Examiner has thus failed to make a *prima facie* case of anticipation for failing to specifically address those steps of Claim 8 not recited in Claim 1.

In their discussions above regarding Claim 1, the Applicants have shown that *Boulos* does not teach or suggest “applying a high magnetic field to at least one member of nanopowder precursor material in an area of plasma interaction with the at least one member of nanopowder precursor material.” Further, the Examiner is silent relative to the step in Claim 8 of “applying a high power pulsed electrical discharge arc to at least one member of nanopowder precursor material to generate a plasma that interacts with the gaseous atmosphere to produce nanopowder.” *Boulos* only recites producing a

plasma using a high frequency induction coil. There is simply no disclosure or even suggestion of applying a high powered electrical discharge arc.

Therefore the Applicants respectfully assert that the rejection of Claim 8 as being anticipated by *Boulos* is traversed by the above arguments and for the same reasons as Claim 1.

Claim 9. Claim 9 is directed to a system for synthesizing nanopowder in increased yields with reduced nanoparticle agglomeration that is similar to the system of Claim 7 with the addition that Claim 9 recites a means for applying a coating precursor material to the nanopowder to reduce nanoparticle agglomeration. The Applicants have shown that *Boulos* does not anticipate the system of Claim 7 and therefore *Boulos* does not anticipate the system of Claim 9 that has the additional limiting element of a means for applying a coating precursor material to the nanopowder to reduce nanoparticle agglomeration.

Moreover, the Examiner has failed to make a *prima facie* case of anticipation for failing to specifically address those elements of Claim 9 not recited in Claim 7. Therefore, the Applicants respectfully assert that the rejection of Claim 9 as being anticipated by *Boulos* is traversed by the above arguments and for the same reasons as Claim 1.

Claim 18. Claim 18 is an independent claim directed to a system for synthesizing nanopowder in increased yields with reduced nanoparticle agglomeration. The system of Claim 18 includes (i) at least *one member of precursor material for ablation* in producing a plasma; (ii) *a solenoid magnet*, having a principal axis which is axially aligned with the at least one member of precursor material, for applying a high magnetic field in near proximity to interaction of the at least one member of precursor material with the plasma; (iii) means for immersing the at least one member of precursor material in a gaseous atmosphere of one of a reaction gas, a quenching gas, and a combination of the reaction gas and the quenching gas; and (iv) *power means*, in electrical connection with the

solenoid magnet and the at least one member of precursor material for ablation, *for generating the high magnetic field and the plasma*. *Boulos* fails to anticipate all the elements of Claim 18 and their interrelationships.

*Boulos* makes no mention of a precursor material for ablation in producing a plasma. *Boulos* shows an induction coil 18 for producing a plasma by radio frequency (RF) heating a gaseous (non-ablative) material. *Boulos* does not teach or suggest a *solenoid magnet*, having a principal axis which is axially aligned with the at least one member of precursor material, for applying a high magnetic field in near proximity to interaction of the at least one member of precursor material with the plasma. An RF induction coil may be solenoidal in shape but it is not a *solenoid magnet*. An RF induction coil will heat and may destroy any material brought within its electromagnetic field; that is the function of induction coil 18 of *Boulos*, to heat a gas to produce a plasma. *Boulos* also does not teach or suggest and thus does not anticipate a *power means*, in *electrical connection* with the solenoid magnet and the at least one member of precursor material for ablation, *for generating the high magnetic field and the plasma*. *Boulos* does not ablate any precursor material and does not teach or suggest electrical connection to precursor material used to make nanopowders. *Boulos* directs a plasma formed by induction heating into gaseous (non ablative) material to form a nanopowder. See *Boulos* paragraph [0061]. Moreover, as noted above for Claim 1, *Boulos* does not disclose or suggest generating or applying a high magnetic field.

Therefore the Applicants respectfully assert that the rejection of Claim 18 as being anticipated by *Boulos* is traversed by the above arguments and for the same reasons as Claims 1 and 9.

## V. CONCLUSION

Claims 1, 7-10, and 18 have been amended to correct grammatical errors and to use language to consistently refer to elements in the claims.

Claims 2-6, 11-17, and 19-25 are allowed in their original form.

The Applicants, therefore, respectfully assert that amended Claims 1, 7-10, and 18 and Claims 2-6, 11-17, and 19-25 are now in condition for allowance and request an early allowance of these claims.

Applicants respectfully request that the Examiner call Applicants' attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining problems.

Respectfully submitted,

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